AL.2.1994-263
C:2

CANADIANA
SEP 21 1993

ALBERTA
BARLEY
PRODUCTION SURVEY

Alberta
AGRICULTURE AND
RURAL DEVELOPMENT
Field Crop Development Centre

BARLEY PRODUCTION SURVEY

INTRODUCTION

During the fall of 1991 and early winter of 1992, an extensive survey was conducted covering the province of Alberta, which was subdivided into eight agro-ecological areas plus an irrigation area superimposed over Southern Alberta. District Agriculturist selected 412 barley growers to complete a 28 page questionnaire dealing with all aspects of their barley production practices. The producers were asked to select one of their barley fields and answer questions based on the treatment that field received for the production of the 1991 crop.

The number of producers from any one D.A. district was proportionate to the amount of barley that district contributes to the average provincial production. In this way, the analysis of producer techniques would statistically represent the barley producers of Alberta. This sampling was accomplished with the help of the Statistics Branch, Alberta Agriculture.

The data was sorted and the effects of abnormal moisture, hail and disease were eliminated from the data as much as possible. A top group of farmers, based on yield, was identified for each area. Generally this amounted to the top 40 per cent of the producer returns in any one area. Provincially this top group averaged 85 bu/ac which compares to Alberta's 52 bu/ac average yield in the same year.

A comparison of the various management factors that contribute to this 64 per cent yield increase over the provincial average is contained in this report. In addition, each areas data is presented for a more specific report. No one factor of production automatically resulted in high yields. It is a combination of many factors, each contributing in a small way to an overall large yield increase. Areas 7 and 8 were combined due to inadequate number of returns from each individual area. Area 9 has very limited data.

The information in this publication follows the flow of events through a production year, starting with 1990 after fall harvest field operations.

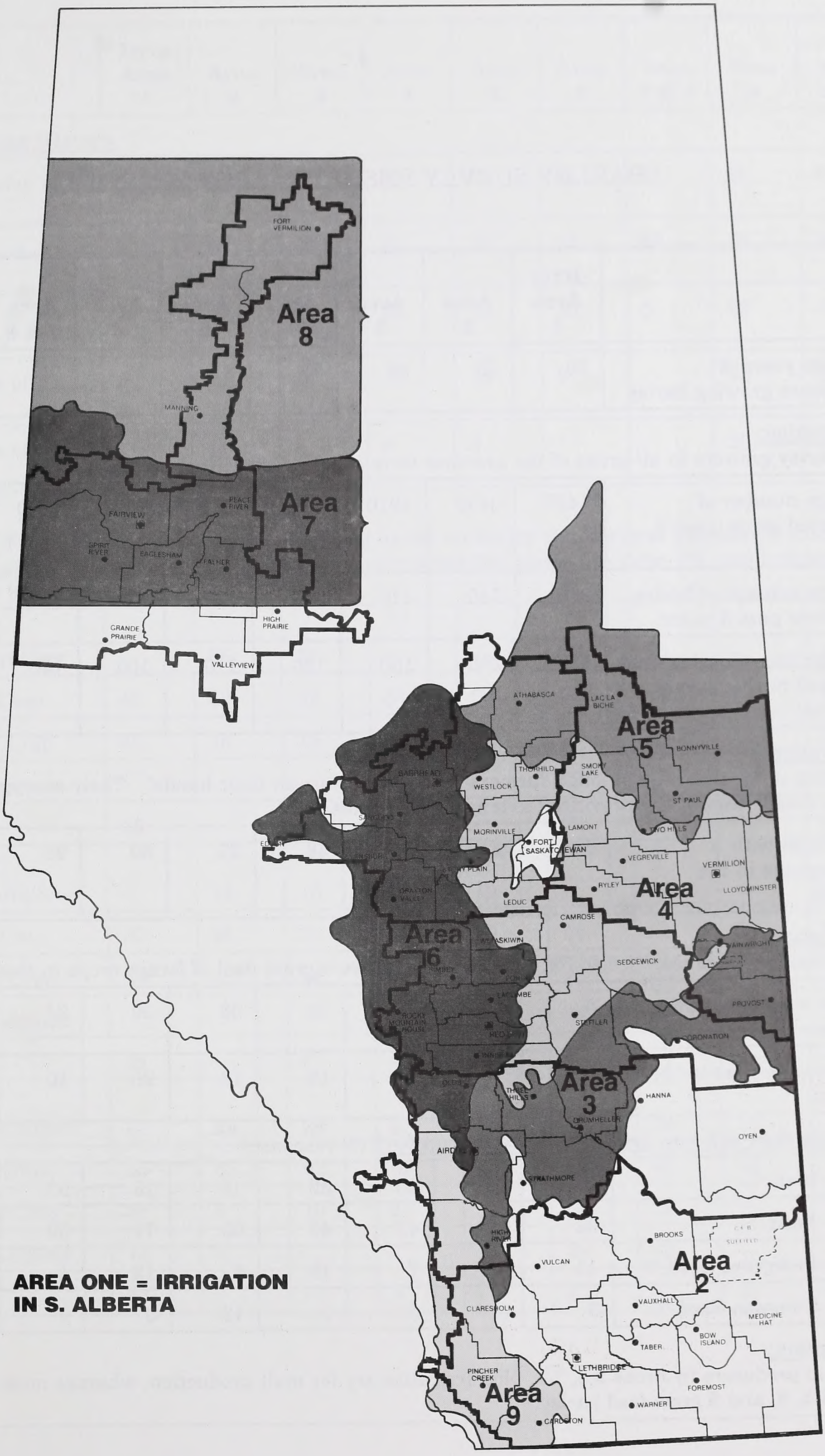
The information is mainly subjective, but clear trends are indicated when the majority of top producers in any area are using the same production practice.

ACKNOWLEDGEMENT

The author wishes to express a sincere thank you to the Field Services Division, Alberta Agriculture, in particular the District Agriculturists who selected the producers and oversaw the completion of the questionnaires; to Mr. C.E. Sterling and Chuanliang Su of the Statistics Branch for their assistance in planning, implementation, data compilation and analyses.

A special thank you to all the producers who gave so freely of their time and information.

Murray B. McLelland
Supervisor, Cereal Crops
Field Crop Development Centre
Alberta Agriculture, Lacombe



AREA ONE = IRRIGATION IN S. ALBERTA

BARLEY SURVEY RESULTS - CROP YEAR 1991

<table>
<tr><th></th><th>Irrig Area 1</th><th>Area 2</th><th>Area 3</th><th>Area 4</th><th>Area 5</th><th>Area 6</th><th>Area 7 & 8</th><th>Area 9</th><th>Prov Avg</th></tr>
<tr><td>Average years of experience growing barley</td><td>20</td><td>23</td><td>26</td><td>23</td><td>21</td><td>21</td><td>24</td><td>18</td><td>22</td></tr>
<tr><td colspan="10"><u>Observation:</u>
The barley growers in all areas of the province were experienced - averaging 22 years.</td></tr>
<tr><td>Average number of cultivated acres (past 5 years)</td><td>1420</td><td>3410</td><td>1910</td><td>1220</td><td>1210</td><td>1020</td><td>2380</td><td>1780</td><td>1680</td></tr>
<tr><td>Average acreage of barley sown over past 5 years</td><td>275</td><td>740</td><td>470</td><td>500</td><td>420</td><td>430</td><td>530</td><td>890</td><td>500</td></tr>
<tr><td>Average size of barley field described in this survey (in acres)</td><td>110</td><td>250</td><td>150</td><td>120</td><td>110</td><td>100</td><td>140</td><td>170</td><td>130</td></tr>
<tr><td colspan="10"><u>Observation:</u>
These top producers are not small farmers with extra "time on their hands". Their average of 1680 acres is almost double that of the provincial average of 900 acres.</td></tr>
<tr><td>Percentage with a grass/legume in the rotation</td><td>80</td><td>12</td><td>14</td><td>48</td><td>25</td><td>50</td><td>95</td><td>38</td><td>48</td></tr>
<tr><td colspan="10"><u>Observation:</u>
Top producers in Areas 1,4,6,& 7/8, plus Irrigation have a great deal of forage crops in their rotations.</td></tr>
<tr><td>Percent with oats in their rotation</td><td>0</td><td>6</td><td>14</td><td>19</td><td>38</td><td>30</td><td>24</td><td>25</td><td>20</td></tr>
<tr><td>Percent with peas in their rotation</td><td>5</td><td>0</td><td>5</td><td>13</td><td>13</td><td>26</td><td>10</td><td>13</td><td>12</td></tr>
<tr><td colspan="10"><u>What market did you grow the barley crop for?</u> (% response)</td></tr>
<tr><td>Malt %</td><td>46</td><td>58</td><td>48</td><td>32</td><td>18</td><td>18</td><td>57</td><td>45</td><td>39</td></tr>
<tr><td>Feed %</td><td>32</td><td>37</td><td>41</td><td>49</td><td>65</td><td>71</td><td>30</td><td>55</td><td>48</td></tr>
<tr><td>Pedigreed Seed %</td><td>14</td><td>5</td><td>7</td><td>19</td><td>6</td><td>12</td><td>4</td><td>0</td><td>10</td></tr>
<tr><td>Common Seed %</td><td>9</td><td>0</td><td>3</td><td>0</td><td>12</td><td>0</td><td>9</td><td>0</td><td>3</td></tr>
<tr><td colspan="10"><u>Observation:</u>
More top producers in Areas 2,3, 7/8, plus Irrigation try for malt production, whereas most top farmers in Areas 4,5, 6, and 9 grow feed barley.</td></tr>
</table>

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Previous Cropping History									
% not growing Barley on Barley	80	65	62	61	75	62	81	25	64
% growing Barley on Barley	20	35	38	39	25	38	19	75	36
% growing Barley on Barley on Barley	10	35	24	23	13	15	5	38	19
% growing 4 years of Barley	-	29	14	13	13	9	-	25	11
% growing 5 years of barley	-	24	5	6	6	-	-	25	6
Observation: Provincially 64% of top producers recognize that sowing barley on barley is not a good practice for disease control and are rotating to other crops. All other Areas are about the same with Area 7/8, and Irrigation 1 the best and Area 9 the poorest.									
1990 - % Summerfallow	-	35	29	-	-	9	10	-	10
% Cereal Crop	45	47	52	58	69	50	43	75	53
% Oilseed Crop	45	18	19	29	31	20	48	13	29
% Grass/Legume	-	-	-	-	-	15	-	-	3
% Other	10	-	-	10	-	6	-	-	4
1989 - % Summerfallow	-	12	10	10	19	-	14	-	8
% Cereal Crop	80	88	71	65	56	59	52	63	66
% Oilseed Crop	5	-	14	23	25	12	33	13	16
% Grass/Legume	-	-	-	-	-	24	-	13	5
% Other	15	-	5	-	-	6	-	-	4
1988 - % Summerfallow	-	29	29	3	6	9	19	13	13
% Cereal Crop	35	65	62	68	63	44	43	63	54
% Oilseed Crop	35	6	10	23	13	15	19	-	17
% Grass/Legume	15	-	-	-	19	29	19	-	12
% Other	15	-	-	3	-	3	-	13	4

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Observation: There is very little summerfallow amongst top producers in the province except in Areas 2 and 3, where moisture stress has promoted a rotation with fallow every other year, or once in every three years.									
Soil Type: (in %) Brown & Dark Brown	100	82	52	6	-	3	-	25	29
Black & Thin Black	-	18	48	88	57	53	-	75	44
Grey Wooded/Dark Grey	-	-	-	6	43	44	100	-	27
Observation: Top producers within an agro-ecological zone do not have to come from the same soil type.									
Soil Texture: (in %) Clay-Clay loam-loam	32	53	57	58	81	73	67	88	63
Sandy loam-sandy clay loam	63	47	43	39	19	27	29	12	36
Sandy-peaty soil	5	-	-	3	-	-	4	-	1
Observation: Top producers are mainly using loam to clay loam soil, except for Irrigation. However, sandy loam to sandy clay loam soils can produce high yields when handled properly.									
Soil Problem: Very few soil problems were reported of high severity. The top four soil problems reported in descending order were: poor drainage (30%), crusting (25%), wind erosion (16%), & salinity (13%).									
Tillage Practices: % Conventional tillage	90	53	24	84	56	88	67	50	69
% Minimum tillage	10	47	76	16	43	12	29	50	31
% Zero tillage	-	-	-	-	-	-	5	-	1
Observation: The use of minimum or reduced tillage systems has increased greatly over the last 10 years in Areas 2,3,5,7/8, and 9. A decade ago only 10% of farmers were using minimum tillage. The moister areas of the province (4, 6, irrigation, and 7/8) still practice mainly conventional tillage. Zero tillage is not widely practised by these top producers. The farmer perception/ definition of minimum tillage verses conventional tillage may vary greatly.									

<table>
<tr><th></th><th>Irrig Area 1</th><th>Area 2</th><th>Area 3</th><th>Area 4</th><th>Area 5</th><th>Area 6</th><th>Area 7 & 8</th><th>Area 9</th><th>Prov Avg</th></tr>
<tr><td colspan="10"><u>Summerfallow Tillage Sequence (%)</u>
Times over the field -</td></tr>
<tr><td>1</td><td>none</td><td>100</td><td>100</td><td>none</td><td>none</td><td>100</td><td>100</td><td>none</td><td>N/A</td></tr>
<tr><td>2</td><td>none</td><td>100</td><td>100</td><td>none</td><td>none</td><td>100</td><td>100</td><td>none</td><td>N/A</td></tr>
<tr><td>3</td><td>none</td><td>100</td><td>100</td><td>none</td><td>none</td><td>100</td><td>100</td><td>none</td><td>N/A</td></tr>
<tr><td>4</td><td>none</td><td>83</td><td>50</td><td>none</td><td>none</td><td>75</td><td>-</td><td>none</td><td>N/A</td></tr>
<tr><td>5</td><td>none</td><td>17</td><td>17</td><td>none</td><td>none</td><td>50</td><td>-</td><td>none</td><td>N/A</td></tr>
<tr><td>6</td><td>none</td><td>-</td><td>-</td><td>none</td><td>none</td><td>25</td><td>-</td><td>none</td><td>N/A</td></tr>
<tr><td colspan="10"><u>Observation:</u>
In Area 2 and 3 where summerfallow is practised, top producers generally get by with only four tillage passes over the land. They try to lose as little moisture as possible, conserve as much crop residue cover as possible, and still control the weeds. In Area 6, very little summerfallow is practised (see page__5__) but when it is, one additional pass is generally needed in this more moist area to keep the weeds under control.</td></tr>
<tr><td colspan="10"><u>Fall (after harvest) Tillage Sequence %</u>
Times over the field -</td></tr>
<tr><td>1</td><td>90</td><td>6</td><td>19</td><td>84</td><td>94</td><td>68</td><td>86</td><td>63</td><td>65</td></tr>
<tr><td>2</td><td>40</td><td>-</td><td>10</td><td>61</td><td>31</td><td>47</td><td>29</td><td>13</td><td>34</td></tr>
<tr><td>3</td><td>10</td><td>-</td><td>-</td><td>13</td><td>6</td><td>15</td><td>-</td><td>-</td><td>7</td></tr>
<tr><td>4</td><td>5</td><td>-</td><td>-</td><td>-</td><td>-</td><td>6</td><td>-</td><td>-</td><td>2</td></tr>
<tr><td colspan="10"><u>Observation:</u>
1. Very few (6% and 19%) do any after harvest tillage in Areas 2 & 3 where soil erosion protection is essential.
2. In all other areas of the province, top producers generally do two fall tillage passes.
3. Non-tillage passes occurred in Areas 2 & 3 for application of granular fertilizer and herbicides. (data not shown)</td></tr>
<tr><td colspan="10"><u>Spring (pre-seeding) Tillage Sequence %</u>
Times over the field -</td></tr>
<tr><td>1</td><td>95</td><td>94</td><td>91</td><td>84</td><td>88</td><td>97</td><td>88</td><td>88</td><td>91</td></tr>
<tr><td>2</td><td>30</td><td>35</td><td>43</td><td>29</td><td>44</td><td>53</td><td>48</td><td>38</td><td>41</td></tr>
<tr><td>3</td><td>-</td><td>-</td><td>5</td><td>7</td><td>13</td><td>18</td><td>-</td><td>-</td><td>7</td></tr>
<tr><td>4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="10"><u>Observation:</u>
The majority of top producers generally only one till pass before seeding in the spring. The main purpose of this pass is to incorporate fertilizer or herbicide, to loosen & open the soil, and/or to kill weeds.</td></tr>
</table>

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Machinery Used for Preseeding Operations:									
1st Pass: Cultivator/Vibrashank	95	100	100	100	85	85	100	85	94
Discer	5	-	-	-	15	15	-	15	6
2nd Pass: Cultivator/Vibrashank	66	83	89	100	85	100	100	100	93
Discer	17	-	11	-	15	-	-	-	4
Rod Weeder	17	17	-	-	-	-	-		3

Observation:
The cultivator/vibrashank is the main preseeding spring tillage implement used.

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Seeding Implement Used: (in %)									
Double Disc	32	-	5	45	44	60	15	13	31
Hoe Drill	69	59	38	35	25	27	45	13	40
Air Seeder	-	24	43	17	31	6	30	63	22
Air Drill	-	18	14	-	-	6	10	13	7
One way Disc	-	-	-	3	-	-	-	-	1

Observation:

1. Air seeders have become quite popular with top growers in Areas 2, 3, 5, 7/8 and 9.
2. The Hoe Drill is popular in Southern Alberta and the Peace River County, whereas the double disc is most popular in Central Alberta.

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Harrowing:									
Harrows attached to Seeder	5	12	33	28	31	18	15	63	23
Harrowed after seeding	5	12	52	83	44	64	40	63	49
Harrowed at or after seeding	10	24	86	100	75	82	55	100	72

Observation:
Harrowing at or after seeding is popular with top producers except in Areas 1, 2 & 7/8. The decreased popularity of harrowing in the Peace River region can be partially accounted for by the desire to maintain good soil surface particle size to help minimize crusting of their grey wooded soils. In Areas 1 & 2 concern over soil erosion may deter the used of harrows.

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Rate the soil surface straw cover after the fall tillage operations: Percentage of producers answering -									
Medium, Heavy, and Very Heavy (30 - 50% plus of soil surface covered)	60	94	83	80	81	52	62	88	72
None, Very Light & Light (0 - 20% of soil surface covered)	40	6	17	20	19	48	38	12	28
Observation: Most of the top producers maintain a straw cover on the soil surface for overwinter protection and moisture conservation.									
Seedbed Firmness: Percentage of producers answering -									
Firm (shoe sinks 1" or less)	95	100	81	74	88	82	76	75	83
Loose (shoe sinks more than 1")	5	-	19	26	12	18	24	25	17
Observation: Top producers seed into a firm seedbed -									
Rate seedbed moisture at seeding time: Percentage of producers answering -									
Good to Very Good	85	77	52	84	75	85	91	88	80
Poor to Fair	15	24	48	16	25	15	10	13	20
How close to the soil surface was the moisture just prior to seeding?									
Average Depth (in inches)	1.3	1.0	1.3	0.9	1.6	1.1	0.8	0.9	1.1
Observation: Top producers maintain good seedbed soil moisture to within one inch of the soil surface. This permits shallow seeding (two inches or less). See seeding depth page __11__.									
Rate the Overall Final Seedbed Achieved: Percentage of producers answering -									
Good to Very Good	85	88	86	90	94	91	91	100	90
Fair	15	12	14	10	6	9	9	-	10

	Irrig Area 1	**Area 2**	**Area 3**	**Area 4**	**Area 5**	**Area 6**	**Area 7 & 8**	**Area 9**	**Prov Avg**
Observation: About 90% of the top producers prepared a good seedbed which correlates with seedbed firmness and moisture observations. Good yields start with a good seedbed.									
Using Soil Temperature : (in %)	25	12	24	19	31	21	24	13	21
- Using soil temperature as an indicator for when to seed has not become very popular, with only 21% of the producers reporting that they knew their soil temperature. Of those that answered, the soil temperature averaged 9.6 degrees Celsius.									
Seeding Date:									
% Before May 1	20	41	-	-	-	9	-	-	7
% On or Before May 24	90	94	67	84	81	82	100	50	83
% After May 24	10	5	33	16	19	17	-	50	17
Observation: Top producers seed on or before May 24th.									
Most popular three varieties by Area - (in%)	Harring. 45	Harring. 77	Harring. 57	Harring. 16	Leduc 31	Leduc 29	Harring. 48	Harring 75	Harr. 37
	Duke 25	Hector 12	Leduc 10	Leduc 13	Harring. 13	Duke 29	Johnston 10	Leduc 13	Leduc 15
	Heartland 15	Galt 6	Other -	Bonanza 13	Abee 13	Harring. 15	B1602 10	Virden 13	Duke 11
What characteristics made you choose this variety? (1=first choice, 2=second choice, & 3=third choice)									
Yield	1	1	1	1	1	1	1	1	1
Lodging Resistance	2	3	-	3	2	2	2	-	2
Marketability	3	2	2	2	-	-	-	2	3
Maturity	-	-	3	-	-	-	3	-	-
Quality of end Product	-	-	-	-	3	-	-	3	-
Disease Resistance	-	-	-	-	-	3	-	-	-

Observation:

Top producers use modern varieties and generally try for the premium malt market, except in Areas 4, 5 & 6 where feed quality is more likely to occur. As a result, the top producers in Areas 4,5 & 6 are planting more of the higher yielding feed varieties in these areas.

The main variety selection characteristics are yield, lodging resistance, marketability, maturity, & quality of end product.

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Seed Source:									
% Using Pedigreed Seed	55	12	52	68	44	44	48	25	47
% Using Common Seed	45	88	48	32	56	56	52	75	53
Observation: Top producers use pedigreed seed to a greater extent, compared to the provincial average usage of 15-20%. Pedigreed seed usage is not as popular in Areas 2 & 9.									
Germination: (in %)	96	97	96	97	97	97	95	98	97
Observation: Top producers know their seed germination rate (80% could answer the question) and sow high germinating seed (Average 97%)									
Seed Treated: (in %)	95	100	76	84	63	38	91	88	75
Of those who treated, the % who treated with: Single	74	67	78	96	100	85	95	100	86
Dual	26	33	22	4	-	15	5	-	14
Observation: Top producers generally use a single (fungicide) seed treatment rather than a dual one (fungicide plus insecticide). Most top producers are treating their barley seed. Area 6 has the lowest % treating but there are 52% more treating in this area than indicated by our survey 10 years ago.									
Depth of Seeding: (in ")	2.1	1.6	1.9	2.1	1.8	1.8	1.7	1.9	1.9
Observation: Top producers seed shallow at 2" or less. This corrolates with preparing a good seedbed and maintaining good seedbed moisture.									
Seeding Rate: (lbs/acres)	101	62	71	81	95	84	96	84	84
Observation: Depending on the 1000 kernel weight and % germination, these seeding rates vary from 16 to 26 seeds per square foot with the average being about 22.									
Do you know the 1000 Kernel Weight of the seed sown? (in %)	0	0	0	3	0	6	0	0	2
Do you seed for a target plant population per square foot? (in %)									
Yes	20	24	19	23	19	21	10	25	20
No	80	76	81	77	81	79	90	75	80

<table>
<tr><th></th><th>Irrig Area 1</th><th>Area 2</th><th>Area 3</th><th>Area 4</th><th>Area 5</th><th>Area 6</th><th>Area 7 & 8</th><th>Area 9</th><th>Prov Avg</th></tr>
<tr><td colspan="10">Observation:
Very few people know the 1000 Kernel Weight of their seed, yet 20% approximately say they seed to a target plant population. This is confusing because you cannot calculate a seeding rate for a target plant population unless you know the 1000 Kernel Weight.</td></tr>
<tr><td colspan="10">Days to Emergence: (in %)</td></tr>
<tr><td>Up to 10 days</td><td>90</td><td>81</td><td>95</td><td>90</td><td>88</td><td>94</td><td>90</td><td>88</td><td>90</td></tr>
<tr><td>Over 10 days</td><td>10</td><td>19</td><td>5</td><td>10</td><td>12</td><td>6</td><td>10</td><td>12</td><td>10</td></tr>
<tr><td colspan="10">Observation:
Top producers have barley seedling emergence within 10 days.</td></tr>
<tr><td colspan="10">Stand Emergence was: (in %)</td></tr>
<tr><td>Uniform</td><td>90</td><td>100</td><td>91</td><td>90</td><td>75</td><td>88</td><td>90</td><td>100</td><td>90</td></tr>
<tr><td>Patchy/Uneven</td><td>10</td><td>-</td><td>9</td><td>10</td><td>25</td><td>12</td><td>10</td><td>-</td><td>10</td></tr>
<tr><td colspan="10">Observation:
Top producers achieve a uniform seedling stand. In Area 5 the main reason given for a patchy/ uneven stand was a dry seedbed and the resulting deep seeding.</td></tr>
<tr><td colspan="10">Seedling Growth: (in %)</td></tr>
<tr><td>Healthy/ Vigorous</td><td>65</td><td>77</td><td>71</td><td>81</td><td>56</td><td>74</td><td>76</td><td>63</td><td>72</td></tr>
<tr><td>Average/ Medium</td><td>20</td><td>23</td><td>29</td><td>19</td><td>44</td><td>21</td><td>24</td><td>37</td><td>25</td></tr>
<tr><td>Slow/ Stunted</td><td>15</td><td>-</td><td>-</td><td>-</td><td>-</td><td>6</td><td>-</td><td>-</td><td>3</td></tr>
<tr><td colspan="10">Observation:
Top producers achieve a healthy/ vigorous seedling stand which is very important in obtaining high yields.</td></tr>
<tr><td colspan="10">Plant Population Density: (in %)</td></tr>
<tr><td>Under 15 Plants/sq.ft.</td><td>-</td><td>80</td><td>50</td><td>25</td><td>29</td><td>33</td><td>33</td><td>-</td><td>n/a</td></tr>
<tr><td>15 - 25 Plants/sq.ft.</td><td>71</td><td>20</td><td>26</td><td>60</td><td>57</td><td>67</td><td>67</td><td>-</td><td>n/a</td></tr>
<tr><td>Over 25 Plants/sq.ft.</td><td>29</td><td>-</td><td>25</td><td>15</td><td>14</td><td>-</td><td>-</td><td>-</td><td>n/a</td></tr>
<tr><td colspan="10">Observation:
This data is based of limited information (very few producers could answer this question) except in Area 4. However, the data suggests most top farmers seed to produce a plant stand of 15 - 25/sq.ft. except in the drier Areas 2 & 3 where under 15 plants/sq.ft. is most popular.</td></tr>
</table>

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Soil test this year: (in %)									
Yes	75	35	14	39	44	44	48	25	42
No	25	65	86	61	56	56	52	75	58
If didn't soil test this year, then; (in %) 1. Estimate your soil fertility -									
Had an opinion	100	73	72	74	78	68	100	83	78
Don't know	-	27	28	26	22	32	-	17	22
2. How often do you usually soil test?									
Never	-	-	5	10	-	-	5	-	3
Infrequently	10	29	23	30	20	32	9	12	23
* Once in 4 years	90	72	72	60	80	69	86	88	74
Every 4th year	5	12	5	3	13	9	10	-	7
Every 3rd year	-	30	24	20	13	24	24	38	20
Every 2nd year	15	12	33	20	7	21	19	12	19
Every year	70	18	10	17	47	15	33	38	28

Observation:
Top producers soil test at least once every four years to maintains a good background knowledge on which to base an opinion of the soil's fertility.

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Pounds of Nitrogen per acre applied: (in %) Producers in Category -									
Under 20	5	33	-	-	-	-	-	-	
20 - 30	-	-	11	-	-	-	5	-	
31 - 40	-	11	-	7	-	3	-	-	
41 - 50	5	22	33	10	13	-	10	25	
51 - 60	-	22	33	27	13	38	25	25	
61 - 70	5	11	11	23	19	26	10	13	
71 - 80	-	-	11	27	25	22	20	25	
81 - 90	15	-	-	3	-	9	15	-	
91 - 100	15	-	-	3	13	3	10	13	
101 - 110	20	-	-	-	-	-	5	-	
111 - 120	10	-	-	-	5	-	-	-	
121 - 130	25	-	-	-	13	-	-	-	

Observation:
The majority of top producers in Area 4, 5, 6, 7 & 8, & 9 apply between 51 and 80 (average 65) lbs of nitrogen per acre with lower amounts as we move to the drier Areas 2 & 3. Irrigation farmers use large amounts of nitrogen fertilizer.

Method used to apply the majority of Nitrogen:

Broadcast / sprayed	53	10	-	19	33	34	-	-	22
Banded	47	90	78	81	67	66	95	100	75
Seed applied	-	-	22	-	-	-	5	-	3

Observation:
The majority of the nitrogen is applied by banding except in the Southern irrigation Areas where broadcasting is still popular. Note: anhydrous ammonia application was considered banding and was a very popular source of nitrogen (50% provincially).

When was the bulk of the Nitrogen applied for this crop? (in %)

Fall	47	10	22	45	20	19	35	12	29
Spring	53	90	78	55	80	81	65	88	71

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg

Observation:
The majority of top producers, except Areas 1 & 4, applied the bulk of their nitrogen fertilizer in the spring. However, when asked when do they prefer to apply their nitrogen the following chart shows the change.

When do you prefer to apply most of your nitrogen? (in %)

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Fall	40	35	48	55	25	38	43	50	42
Spring	60	65	52	45	75	62	57	50	58

Observation:
Between 35 to 55% of the top growers prefer to put their fertilizer on in the fall, except Area 5. The main reasons given for not appling nitrogen in the fall of 1990 were; lack of time, shortage of cash flow, and dry soil conditions.

Pounds of Phosphorous (P_2O_5)per acre applied: (in %)
Producers in Category -

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Under 10	5	21	5	-	-	3	-	-	4
10 - 20	5	57 *	33	3	13	9	14	-	15
21 - 30	5	14	48	52	38	33	43	63	37
31 - 40	40	7	14	39	38	39	24	13	30
41 - 50	15	-	-	3	12	3	14	-	6
51 - 60	25	-	-	3	-	9	5	25	7
Over 60	5	-	-	-	-	3	-	-	1

Observations:
When interpreting the irrigation Area 1 data, one must remember that quite often there is a large phosphorous residue in the soil after sugar beet and potato production.
Most top producers use phosphorus fertilizer at the 20 - 40 lb per acre range except Area 2 where 10 - 20 lbs per acre is most popular.

Method used to apply the majority of the Phosphorus (P_2O_5): (in %)

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Broadcast	42	-	-	10	6	13	-	-	10
Band	26	31	48	19	26	9	14	75	26
Seed Applied	32	69	52	71	67	78	86	25	64

Observation:
Phosphorus is mainly applied with the seed except in Area 9 where it is banded, Area 3 where it is 50:50 banded verses seed applied and irrigation where it is broadcast. In some cases where the majority of the phosphorus was banded or broadcast, a small amount of phosphorus was also placed with the seed for the "starter effect".

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
When was the bulk of the Phosphorus applied? (in %)									
Fall	37	-	14	10	-	3	10	12	11
Spring	68	100	86	90	100	97	90	88	89
Observation: Phosphorus is applied in the spring by top growers.									
Pounds of Potassium per acre applied: (in %) Producer in Category -									
None	80	94	95	42	19	18	67	50	55
Under 10	5	6	5	16	6	18	10	-	10
10 - 20	5	-	-	35*	50*	41*	24	38*	25
21 - 30	10	-	-	3	13	15	-	-	6
Over 30	-	-	-	3	13	9	-	13	4
Observation: Potassium at the 10 - 20 lb per acre rate is being used in Areas 4, 5, 6 & 9 by 35 to 50 % of the top producers. In all other Areas potassium is not being used to a great extent, but when some is tried it is mainly at a 20 pound per acre rate or less.									
Method used to apply the majority of Potassium: (in %)									
Broadcast	75	-	-	17	17	18	-	-	17
Band	25	-	-	17	33	7	14	75	19
Seed Applied	-	100	100	67	50	75	86	25	64
When was the majority of the Potassium applied: (in %)									
Fall	50	-	-	11	-	4	-	-	7
Spring	50	100	100	89	100	96	100	100	93
Observation: The majority of top producers apply their potassium in the spring when seeding. Banding in the spring is the next most popular time to apply potasium, especially in Area 9 & 5. Approximately twice the rate of potassium is needed when broadcast to be as effective as banding or placing with the seed.									

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Pounds of Sulphur per acre applied: (in %) Producers in Category -									
None	85	88	86	68	69	68	76	88	76
Under 10	5	12	14	16	25	18	14	-	14
10 - 20	10	-	-	13	6	12	10	-	8
Over 20	-	-	-	3	-	3	-	13	2
Observation: Very little sulphur is used in the province; however, Areas 4, 5 & 6 are starting to use some sulphur on barley crops.									
Method used to apply the majority of the Sulphur: (in %)									
Broadcast	68	-	-	40	20	42	-	-	29
Band	33	50	68	30	-	-	20	100	22
Seed Applied	-	50	33	30	80	58	80	-	49
When was the majority of the Sulphur applied? (in %)									
Fall	33	-	33	40	-	-	-	-	14
Spring	68	100	68	60	100	100	100	100	86
Observation: The little sulphur used is applied mainly in the spring and either banded or seed applied. Sulphur is quite mobile in the soil so the method of application is not critical.									
Was Manure applied to the Field? (in %)									
Yes	10	18	-	7	6	21	-	-	9
No	90	82	100	93	94	79	100	100	91
Observation: Very little manure was applied for this 1991 barley crop in any Area.									
Were Micro-nutrients applied?									
Yes	-	-	-	10	-	9	-	-	4
No	100	100	100	90	100	91	100	100	96
Observation: Micro-nutrients are not generally used in Alberta on barley crops.									

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Fall Herbicide Application: (in %)									
None	85	88	71	71	94	94	100	100	87
Triallate	-	6	10	23	-	6	-	-	7
Trifluralin	10	6	19	3	6	-	-	-	5
Triallate plus Trifluralin	5	-	-	3	-	-	-	-	1
Observation: Fall applied wild oat control occurs among 13% (prov. avg) of the top producers and is most popular in Areas 3 & 4.									
Spring Applied Pre-emergence Herbicides? (in %)									
Triallate	10	18	19	19	44	24	19	25	21
Triallate plus Trifluralin	5	-	-	6	-	-	-	-	2
Trifluralin	-	-	5	-	-	-	-	13	1
Spring applied Post-emergence Herbicides? (in %)									
Hoe-gross	40	6	-	3	6	9	5	-	9
Assert	-	-	5	3	6	12	38	25	10
Avenge	15	6	10	10	6	3	5	-	7
Refine	-	-	10	6	13	27	5	-	10
MCPA	15	-	24	26	50	38	43	13	28
2,4-D	35	53	19	19	-	3	19	63	21
Bromoxynil	15	29	33	10	19	6	5	-	14
Ally/Glean	-	12	14	52	6	18	10	13	19
Dicamba	10	29	10	10	6	12	5	13	11
Other	15	-	5	10	31	9	10	25	14

Observation:

1. 70% of our top producers used some type of wild oat herbicide, 13% fall applied, 23% pre-emergence spring applied and 34% post-emergence spring applied.
2. Most producers are using more than one type of broadleaf herbicide, usually as mixes.
3. When asked to rate the effectiveness of their herbicides, 90% said they received good to excellent results.

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
What were the major yield reducing weeds in the crop after the herbicide program? (in %)									
None	35	47	76	42	38	47	62	38	49
Wild Oats	25	18	5	29	25	21	5	25	19
Canada Thistle	20	-	10	16	25	6	10	25	13
Chickweed	-	-	-	16	25	21	10	-	11
Hemp-nettle	-	-	-	10	25	18	-	13	8
Quack grass	5	-	5	13	19	6	5	13	8
Observation: These are the same major weeds as reported 10 years ago in a similar survey.									
Rate the weediness of the growing crop: (in %)									
None to light	95	88	95	90	75	91	95	100	91
Moderate to heavy	5	12	5	10	25	9	5	-	9
Observation: Top producers control their weeds.									
Insects: **Yield loss due to Insects - (in %)**									
None to light	100	100	100	100	100	100	100	100	100
Moderate to heavy	0	0	0	0	0	0	0	0	0
Observation: In 1991 insect damage in all areas was not significant.									
Disease: **The producers who report a moderate to Heavy disease rating for - (in %)**									
Net Blotch	-	12	-	10	6	15	5	-	7
Scald	-	12	5	10	6	18	5	13	12
Others	-	12	-	-	-	3	15	-	4

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Yield loss due to disease:									
None-light	100	100	95	90	94	94	100	100	96
Moderate-heavy	-	-	5	10	6	6	-	-	4
Observation: Top producers keep their disease damage to minimum through variety selection, rotation, seedbed preparation, fertility and seed treatment. Using production practices that promote rapid, vigorous growth aids in disease prevention.									
How often did you inspect the field for potential weeds, insects and disease? (in %)									
Daily	5	-	-	-	6	-	19	13	4
Twice/ Week	35	24	14	16	25	18	29	13	21
Weekly	60	59	67	68	56	65	48	75	62
Bi-weekly	-	6	5	3	-	-	5	-	2
Other	-	12	14	13	13	17	-	-	10
Observation: The majority of top producers inspect their fields a least once every week in the seedling stage and almost as often during the rest of the growing season (data not shown).									
Crop lodging: (in %)									
None to light	35	82	72	65	94	65	86	63	69
Moderate	55	18	24	29	6	27	5	25	24
Severe	10	-	4	7	-	6	10	13	6
Observation: Lodging is not a serious problem due to variety selection and proper management by top producer. However high yields still results in some lodging which shows the need for further variety improvement.									
Shattering Crop Loss: (in %)									
None - light	75	88	86	97	81	94	100	100	91
Moderate	20	-	14	-	19	3	-	-	7
Severe	-	12	-	3	-	-	-	-	2
Observation: Shattering losses were not severe. However, we do see more loss in the windier Southern Alberta.									

IRRIGATION SCHEDULE

System			Growth Stage		
	Average date of first application	Amount (inches)	Seedling	Tillering	Stem Elongation
Centre Pivot	June 10th	1.1	33%	56%	11%
Wheel Move	June 15th	3.5	33%	66%	-
Flood	July 2	5.3	Boot to Heading Stage		

System			Growth Stage			
	Average date of first appication	Amount (inches)	Seedling	Tillering	Stem Elongation	
Centre Pivot	June 25th	1.3	44%	33%	22%	Continued as needed
Wheel Move	July 4th	3.5	33%	Boot to flowering		
Flood	Only Received one Flood					

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Method of Harvesting: (in %)									
Swathed	100	53	81	94	75	91	71	100	84
Straight Combined	-	47	19	6	25	9	29	-	16
Observation: Straight combining is increasing in popularity among top producers especially in Areas 2, 5 and 7/8.									
Was a crop desiccant used?									
No	100	100	100	100	100	100	100	100	100
Height of stubble remaining in the field after harvest: (in %)									
Under 5 "	5	-	19	19	6	21	24	13	15
5 - 8 "	85	59	52	74	88	76	76	88	74
over 8 "	10	41	29	7	6	3	-	-	11
Observation: 1. In the windy dry Southern Areas, top producers tend to leave higher stubble heights to catch more snow and protect the land from wind erosion. 2. Five to eight inches is the most popular stubble height.									
Did you leave uneven stubble height to enhance snow trapping? (in %)									
No	100	94	95	100	100	100	94	100	98
Yes	-	6	5	-	-	-	6	-	2
Observation: Varying the stubble height to enhance snow trapping has not caught on yet.									
Size of swather used: (in %)									
Under 15 feet	6	-	-	-	7	12	-	-	4
15 - 20	13	-	-	72	33	55	24	-	32
20 - 25	81	35	30	28	47	27	65	63	42
over 25 feet	-	65	70	-	13	6	12	38	22
Observation: Large swathers are popular on the Great Plains of Southern Alberta.									
Average % kernel moisture at combining:	12.1	12.7	12.4	13.4	13.2	14.2	15.0	12.8	13.4

	Irrig Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7 & 8	Area 9	Prov Avg
Did you use bin aeration? (in %)									
Yes	15	19	24	23	6	26	48	-	23
No	85	81	76	77	94	74	52	100	77
Observation: 1. Bin aeration was used mainly in Area 7/8, this year, to bring the grain moisture of 15% down to an acceptable long-term storage % (below 14% approx). 2. Some aeration was, no doubt, used to lower the grain temperature to prevent moisture migration as most of the producers reported the weather to be hot & dry before combining (data not shown).									
Dockage:									
Average %	1.9	1.3	1.0	1.3	1.0	1.4	1.4	0.9	1.3
Bushel Weight: (in %)									
Pounds	50	52	50	50	48	50	51	51	50
Grade Achieved: (of those who answered this question)									
Number 1 (Feed or Malt)	100	100	100	100	100	100	100	100	100
Observation: Top producers achieve high grades, heavy test weight, low dockage barley.									
Average gross yield: Bushels/acre	105	75	73	85	73	95	80	84	85
Average Provincial Yield: (Same Year)	68	45	52	49	43	61	48	56	54
Five year average yield: Bushels/acre	100	57	65	77	74	79	67	70	75
Highest yield in last 5 years: Bushels/acre	110	73	89	97	94	99	92	93	95
Provincial 5 Year Average:	85	40	60	51	46	61	50	53	52

Summary of Trends Indicated by the Survey Results

The major production practices of top producers in 1991 were:

1. Top producers avoid sowing barley on barley to prevent disease build-up through rotation with other crops.
2. There is very little summerfallow except in Areas 2 and 3, where moisture stress has promoted fallow every other year or once in every three years.
3. Fall tillage is kept to a minimum with essentially no tillage in Areas 2 & 3, and generally only two fall tillage passes in the rest of the province.
4. About 10 percent of the top producers seed with no prior spring tillage, 90 % do only one pre-seeding tillage operation with a cultivator/vibrashank type implement. Pre-seeding tillage is kept to a minimum.
5. A soil surface straw cover is maintained for over-winter soil protection and moisture conservation.
6. Top producers achieve a firm, moist seedbed with moisture to within one inch of the soil surface.
7. Top producers seed early at a depth of 2 inches or less.
8. The use of pedigreed seed by top producers is 2-3 times that of the provincial average. Good quality, high germinating seed is a priority.
9. The seed is treated to help fight disease.
10. They achieved a healthy, vigorous, uniform seedling stand.
11. Top producers soil test at least once every four years to maintain a background knowledge on which to base soil fertilizer decisions.
12. Nitrogen fertilizer was mainly applied by banding in the spring of the year. However, when time, cash and/or soil conditions allow, almost half the top producers (42%) stated that they preferred to apply their nitrogen in the fall.
13. Top producers achieved good weed control by using a variety of herbicides including mixes.
14. Diseases and insects were controlled.

Bibliothèque nationale du Canada
3 3286 50434 1930